Space Weather Forecast

Issued on Friday, 19 April 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-flares likely and a slight chance of Strong-flares. G1/Minor Storm interval due to arrival of a CME early day 1 (19 Apr), gradually waning. Slight chance of G1/Minor Storm conditions day 2 (20 Apr) due to a fast wind from a coronal hole. Further slight chance of G1/Minor Storms end of period due to possible glancing CMEs.

Solar Activity: Activity is currently Moderate. The largest flare was a Moderate flare at 18/0453 UTC from a small region amongst a cluster of sunspot groups in the southeast disc. There are fourteen sunspot regions currently visible on the disc, of which the largest is in the northeast quadrant. The most magnetically complex region lies within the cluster of sunspots located in the southeast of the disc, of which two other groups show moderate to complex magnetic structures. The remaining regions on the visible disc appear generally stable with only slight or no changes through the period.

Several coronal mass ejections have been observed from an area near AR3638 over the past 24 hours. Most of these of the CME's have been analysed, with weak glancing blows possible on 21 or 22 Apr. However, confidence is low regarding this. No other Earth-directed CMEs have been observed.

Solar Wind / Geomagnetic Activity: Solar wind parameters started the period at background levels, before increasing to slightly elevated levels, just above 400km/s, due to the late arrival of a CME which left the Sun on the 15 Apr. The magnetic field (IMF) strength, Bt, was initially weak, before increasing to moderate to strong levels, due to CME arrival. The all-important north-south component, Bz, was mostly positive at the start of the period, becoming negative due to the CME. Resultant geomagnetic activity was mostly Quiet (Kp0-2) initially, before increasing to reach G1/Minor Storm (Kp5) interval 19/0600-0900 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with isolated Moderate-class flares expected and a slight chance of isolated Strong flares.

Solar Wind / Geomagnetic Activity: A CME, which left the Sun on the 15 Apr, looks to have arrived early day 1 (19 Apr), with geomagnetic activity reaching G1/Minor Storm level, although these effects should quickly wane. Further CMEs associated with streams of plasma originating from a small region in the southeast may give some glancing blows during days 3 and 4 (21st and 22nd), although confidence is low. Solar winds are currently at slightly elevated due to the recent arrival of a CME, near 400km/s, but a recurrent coronal hole fast wind is expected to arrive on day 2 (20 Apr) likely increasing speeds to elevated levels, continuing into day 3 (21 Apr), before gradually waning by day 4 (22 Apr).

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Geomagnetic activity has started the period at G1/Minor Storm levels due to the arrival of a CME, but should gradually reduce to Active or Unsettled (Kp3-4) conditions, becoming mostly Quiet (Kp1-2) by the end of day 1 (19 Apr). Activity may increase to occasionally reach Active to G1/Minor Storm (Kp 4-5) levels tomorrow (20 Apr) due to the arrival of a coronal hole fast wind, and also possibly at times during days 3 and 4 (21st and 22nd) due to a slight chance of glancing blows from CMEs.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background with no Solar Radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	Yes	50	30	20	20
Strong	**G3**	No	1	1	1	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**R1-R2 M Class**	Yes	75	75	75	75
Very Active	**R3 to R5 X**	No	15	15	15	15

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	10	10	15
Very Active	**≥ S3 ***	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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